

REMARKS

Reconsideration of this application is respectfully requested. Applicants believe that consideration of this amendment is proper because they have attempted to comply with every requirement expressly set forth in the previous Office Action dated May 24, 2007, and believe the application is now in condition for allowance. A Request for Continuing Examination is being filed herewith since the claim amendments contained herein may raise new issues.

Applicant respectfully thanks the Examiner and her supervisor, Jerry Lorengo, for courtesies extended to the inventor and me in an interview of August 13, 2007. Professor Regalbuto discussed the unique features of his method and a catalyst having finely dispersed metal that is obtained thereby.

Claims 1, 2, 4 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ebner in U.S. Patent No. 6,417,133. Claims 1 and 3-13 stand rejected over Fischer et al. in U.S. Patent No. 6,676,919. The reactive deposition methods of the cited references both use a reducing agent to form metal particles in solution, which are later deposited on the substrate. Neither of these references teaches or suggests Applicant's method of catalyst deposition which electrostatically deposits the metal complex onto the carbon substrate.

Neither Ebner nor Fischer look to the Point of Zero Charge ("PZC") value of the substrate because they are using reactive deposition, not electrostatic

deposition. As shown on page 14 of Prof. Regalbuto's presentation, the BET surface area cannot be seen to read on the PZC values of the substrate as they are independent of each other. PZC reflects the degree of oxidation of the carbon surface. Ebner recognizes that the surface oxidation effects metal deposition, but chooses to eliminate the oxygen. Instead of eliminating the oxygen, the instant invention measures it using the PZC value, then contacts the substrate with a metal complex in a solution of a particular pH that works with the oxidized surface using electrostatic deposition.

Both of the references teach adding a reducing agent to the impregnating solution, which breaks down the metal complex and forms metal particles in the solution. These metal particles are then deposited on the catalyst substrate. Because the metal particles are not attracted to the surface electrostatically, there is less reason to consider the substrate PZC.

In contrast, Applicant's process deposits the metal on the substrate while it is still in the complex form. This is accomplished by contacting the substrate with an aqueous solution having a pH that encourages electrostatic precipitation of the metal complex being used. After deposition of the metal complex, the substrate is heated to break down the complex, leaving the metal particles deposited on the substrate surface. For a given catalyst loading, the metal

particles are typically more finely dispersed and cover more surface area than metals deposited by conventional impregnation techniques.


The cited references fail to reveal the contacting step whereby the pH of the contacting solution and the metal complex have been chosen to encourage electrostatic precipitation. As admitted by the Examiner in the outstanding Office Action, Fischer teaches “the deposition of the platinum metal on the metallic support” at col. 12, lines 8-20. In col. 16, lines 7-11, Ebner describes deposition methods, but fails to include or describe electrostatic deposition. Neither of the references suggest the maintaining step whereby the metal complex to be adsorbed onto the surface. Further, the heating step is not suggested where the adsorbed metal complex is heated under reducing conditions to form the metal particle. The prior art teaches only reducing the complex in solution and depositing the metal particle on the substrate surface.

As suggested by Examiner Lorengo during the interview, the transitional language “whereby use of a carbon substrate” has been amended to read “whereby said carbon substrate” in the independent claims. Further, in response to the Examiners’ request to better define the “carbon substrate”, claim 2 has been incorporated into claim 1 reciting a surface area range. This specifically differentiates the carbon substrate from the carbon alloy substrate of Fischer which would have a surface area substantially below $100 \text{ m}^2/\text{g}$.

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Reply to Office Action of May 24, 2007

By the above arguments and amendments, Applicant believes that he has complied with all requirements expressly set forth in the pending Office Action. Issuance of a Notice of Allowance on the remaining allowed claims is respectfully requested. Should the Examiner discover there are remaining issues which may be resolved by a telephone interview, she is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,
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